



# **HAZARD FUELS MITIGATION GUIDELINES**

*Restoring Our Forests  
Building FireWise Neighborhoods  
Protecting Our Community*

**Oct 2011**

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## INDEX

|  |   |   |   |   |   |   |   |   |   |    |
|--|---|---|---|---|---|---|---|---|---|----|
| <b>Authority</b>                         | .   | . | . | . | . | . | . | . | . | 3  |
| <b>Responsibility</b>                    | .   | . | . | . | . | . | . | . | . | 3  |
| <b>Influencing Factors</b>               | .   | . | . | . | . | . | . | . | . | 3  |
| <b>Background</b>                        | .   | . | . | . | . | . | . | . | . | 3  |
| <b>Methodology &amp; Associated Fees</b> | .   | . | . | . | . | . | . | . | . | 4  |
| <b>Plans</b>                             | .   | . | . | . | . | . | . | . | . | 5  |
| <b>Site Set-Up</b>                       | .   | . | . | . | . | . | . | . | . | 6  |
| <b>Selective Thinning</b>                | .   | . | . | . | . | . | . | . | . | 7  |
| <b>Prescribed Fire</b>                   | .   | . | . | . | . | . | . | . | . | 8  |
| <b>Exemptions</b>                        | .   | . | . | . | . | . | . | . | . | 9  |
| <b>Summary</b>                           | .   | . | . | . | . | . | . | . | . | 10 |
| <br>                                     |   |   |   |   |   |   |   |   |   |    |
| <b>APPENDIXES:</b>                       |   |   |   |   |   |   |   |   |   |    |
|  | <b>1 – Restoration/Hazard Mitigation Position</b>     | . |   |   |   |   |   |   |   | 11 |
|  | <b>2 – Fire Prevention Supplementary Regulations</b>  | . |   |   |   |   |   |   |   | 12 |
|  | <b>3 – Site Operations Plans (formats).</b>           | . |   |   |   |   |   |   |   | 18 |
|  | <b>4 – Tree Thinning and Debris-Piling Guidelines</b> | . |   |   |   |   |   |   |   | 23 |
|  | <b>5 – Smoke Management Practices</b>                 | . | . | . | . | . | . | . | . | 24 |

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*Destructive wildfires are a reality: they have become more common, more damaging, more costly, and more frightening. Those who live in-and-near our forests, and who believe they are not at risk, are wrong. But the good news is that protecting homes and property from wildfire is relatively simple and easy to accomplish – provided one does the work prior to the start of the fire.*

**AUTHORITY:**

- 1) As adopted by City Council:
  - a) Flagstaff Wildland Urban Interface Code (WUI Code)
  - b) Greater Flagstaff Area Community Wildfire Protection Plan (CWPP)
  - c) Land Development Code (LDC)
- 2) FFD Fire Prevention Supplementary Regulations and Procedures (FP-Supp Regs)
- 3) Operating protocols with AZ Dept of Environmental Quality (ADEQ).

**RESPONSIBILITY:** Management of the Hazardous Fuel program rests with the Flagstaff Fire Dept *Wildland Fire Management* (FFD-FM) Division.

**INFLUENCING FACTORS:** Six partnership initiatives have influenced development and use of these Guidelines:

- 1) Recommendations – Governor’s Forest Health Council  
[visit [www.governor.state.az.us/fhc](http://www.governor.state.az.us/fhc)],
- 2) National Fire Plan  
[visit [www.fireplan.gov/](http://www.fireplan.gov/)],
- 3) Western Governor’s Association - Forest Health Advisory Committee  
[visit [www.westgov.org](http://www.westgov.org)],
- 4) National Firewise Program  
[visit [www.firewise.org](http://www.firewise.org)],
- 5) Northern AZ University – Ecological Restoration Institute  
[visit [www.eri.nau.edu](http://www.eri.nau.edu)], and
- 6) Greater Flagstaff Forests Partnership (GFFP)  
[visit [www.gffp.org](http://www.gffp.org)].

**BACKGROUND:** Wildfire is the #1 fire threat to Flagstaff. We experience 60-100 wildfires per year within the city boundaries, and another 150+ on jurisdictions immediately surrounding our community.

Ponderosa pine forests are extremely well adapted to, and dependent upon, frequent low-intensity wildfires, but they are extremely vulnerable to high intensity fire events. Societal demands and resulting management practices during the past century have created a forest that is now severely overcrowded. Unnatural fuel accumulations, exacerbated by insect, disease, and drought, have resulted in an alarming increase in both the size and severity of wildfires. These fires endanger not only the trees themselves, but also other associated resource values such as wildlife habitat, scenic quality, and watershed capacity. In addition to serious ecosystem damage, a single large-scale fire moving into the city will most-assuredly affect lives and properties, and also inflict serious, and long-term, economic harm.

*Hazard Mitigation* is one-of-five – *Prevention, Preparedness, Response, and Recovery* being the others – program areas managed by FFD-FM. To learn more about these, visit

[www.flagstaff.az.gov/wildlandfire](http://www.flagstaff.az.gov/wildlandfire)

Three factors influence fire behavior -- weather, topography, and fuels. Of these, only fuel can be readily manipulated: Hazard mitigation activities, undertaken in a responsible manner and throughout the general area, are vital to ecosystem health and community protection.

Such activities are not meant to eliminate wildfire from the landscape. A century of wildfire suppression, often focused on fire exclusion, has demonstrated conclusively the fallacy of such efforts. Low-intensity fire is required for a healthy ponderosa pine ecosystem, and such fires do not pose a community-wide threat. Reintroduction of such fires requires the re-creation of a forest environment that will burn in a healthy, not-threatening, manner.

Objective of these *Guidelines* is to:

1. Provide standardized resource management assistance to customers we service,
2. Demonstrate professional and socially-acceptable vegetation management,
3. Educate and involve decision-makers, home-and-property owners, the business community, service organizations, and special-interest groups.

**METHODOLOGY & ASSOCIATED FEES:** The steps and actions followed and taken to implement Hazard Mitigation work, including associated fees, varies depending upon the site and work required: FP-Supp Regs that pertain to this issue is found in Appendix 2. In general:

**METHODOLOGY:**

NEW DEVELOPMENTS – Beginning in 1999, the Fire Department and Community Development partnered to develop an Administrative Procedure that required all new homes and subdivisions within the City to implement selective tree thinning and debris disposal on the entire property prior to combustible building materials being allowed on-site. In March 2008, Council adopted the Flagstaff WUI Code which codified, but did not alter, this requirement.

EXISTING DEVELOPMENTS – In general, subdivisions and lots platted-and-approved prior to adoption of the WUI Code will not, unless declared a “*Distinct Hazard*” by FFD as outlined below, be required to conduct selective tree thinning and debris disposal:

- (1) *Discovery* – Usually compliant-driven, but may also occur during routine inspections of the development or neighborhood,
- (2) *Declaration & Notification* – Per process detailed in FPR-007 *Hazardous Fuels Identification & Notification*..

In addition to general advice and counsel, FFD will, on many sites, provide direct assistance, to include planning, site set-up, prescribed fire (Rx fire), and general project oversight.

FFD values the contribution and involvement of private enterprise in addressing the serious wildfire threat and forest health issues of our forests: We will not routinely compete against private enterprise, but will instead actively promote their use, and facilitate, to the maximum extent possible, their success. We will, however, occasionally engage in efforts on selected parcels of any ownership or jurisdiction that are either economically, socially, or culturally important to the community (ex: churches, schools, etc), sites that "tie-together" other scattered previously treated parcels (ex: creation of defensible neighborhoods), those that, once treated, will provide significant protection to adjacent at-risk parcels (ex: parcels upwind and in the "threat-vector" of heavily populated subdivisions or high-risk facilities), and/or those of sufficient size to improve protection or forest health in a widespread area. In addition, only FFD will plan and conduct prescribed burn operations within the City (*NOTE - the lone exception to this exclusion is the use of an Air Curtain Destructor type unit to burn vegetation on site.*)

#### **ASSOCIATED FEES:**

City Council adopted two fees associated with this program effective Aug 2009. A description of each is found in FPR-WUI-002 –*Permits & Fees*.

#### **PLANS:** Two general plan categories are utilized:

##### 1) Prepared by FFD:

- a) General Forest Stewardship Plan (FSP): Strategic in-nature. A single plan has been prepared covering the entire city and contract areas. FFD is responsible for updates of this plan. [View at - [www.flagstaff.az.gov/wildlandfire](http://www.flagstaff.az.gov/wildlandfire) - Documents].
- b) Prescribed Fire Plan (RxP): Due to the relatively small size of most burn projects, as well as their general similarity in goals, fuels, topography, desired fire behavior, and weather requirements, individual burn plans for every site may not be necessary. For all these “generic” sites, a single burn plan will be prepared (or revised from previous ones) on an annual basis. When site conditions or other issues dictate otherwise, a specific burn plan will be prepared for that site.

For planned “Burns of Significance” (usually those over 5-acres in size), the Annual AZ Dept of Environmental Quality (ADEQ) Burn Registration and individual Burn Plan forms are completed and submitted to the State at the beginning of each calendar year. Accomplishment reporting to ADEQ also occurs immediately following each of these type burns. (These forms can be found at [www.azdeq.gov/function/forms/appsair.html#burns](http://www.azdeq.gov/function/forms/appsair.html#burns) – *Smoke Management*.)

##### 2) Prepared by either FFD or Owner/Vendor:

Site Operations Plan (SOP): Tactical in-nature. This thinning-and debris disposal operational plan is to be submitted for review and approval (if completed by Owner/Vendor) prior to the start of work: the Plan format is found in Appendix 3. *NOTE – A Plan is not required and does not pertain to individual tree care or maintenance of ornamental turf, shrubs or trees*

In some cases when a SOP is required, greater detail will be required than that found in the format in Appendix 3. In those cases, the City's Review Team – comprised of FFD and Community Development staff – may, depending upon the site's location and project complexity, conduct a field inspection prior to any tree-cutting activities occurring on the site, and will, within two weeks of the site visit, approve, approve with modifications, or deny the proposed activity(s). Where a site visit is not required, the FFD may review and make a decision to reject, modify, or approve the plan alone. *NOTE -If the owner/developer disagrees with a decision, they may appeal the decision to the City's Building and Fire Code Board of Appeals via submittal of a written letter of appeal within the 10 days of receipt of the decision.*

Once approved to proceed, on-going work will be monitored. Within two weeks of completion, the property owner is to notify FFD that work has been completed.

**SITE SET-UP:** Boundary lines will be determined and identified in some clear-and-consistent manner. Trees to be removed will be marked in one-of-two ways:

- 1) "Cut" tree mark: Preferred, and the most commonly utilized method. Trees to be removed are identified by a spot of blue paint approximately chest-high above ground level. No butt-mark (ground level) is required.
- 2) "Leave" tree mark: Acceptable, but used only when the number of trees to be removed far exceeds those to be left. With this method, trees to be retained are identified with a spot of yellow paint approximately chest-high above ground level. No butt-mark (ground level) is required.

Tree marking will most-likely occur automatically by FM Staff for those parcels submitted by the owner/developer to the City for consideration via the Development Review Board (DRB) process. If available, site development plans supplied by the owner/developer will be reviewed prior to marking.

However, owners/developers of larger parcels, or those sites requiring extensive marking due to density, will be referred to vendors. It will be the responsibility of the owner/developer to conduct the work themselves or select a vendor: the paint scheme outlined above will be followed, and the marking must be approved by FM staff prior to any cutting.

On sites to be cut by the FM Crew, marking is routinely not done. Crew members are trained in "cutter-select" operations – whereby they identify and remove trees on their own – based upon the Desired Future Condition (DFC) of the site as explained and shown to them beforehand by FM Staff.

**SELECTIVE THINNING:** Any tree, regardless of size, may be removed if it is identified to be a hazard to life, property, or improvements: those meeting these criteria will not be counted against any future or planned development's resource protection requirements as described in the LDC. *NOTE – The retention of larger diameter trees is of special interest. In general, removal of these sized trees is discouraged, and may be prevented: any removal will receive careful consideration.*

In addition, the LDC permits unrestricted removal of those trees meeting the following criteria:

- 1) substantially within the drip-line of another tree,
- 2) diseased or infested with insects,
- 3) damaged, dead, or dying,
- 4) less than 6 inches in diameter (chest high), and/or
- 5) intermediate or suppressed.

Although the property owner may do any cutting themselves, the use of vendors is encouraged. Some vendors may also provide associated debris disposal through chipping or hauling services. Property owners are encouraged to utilize a written agreement

To facilitate use of private vendors, FM Staff:

- a. Conducts periodic vendor-development workshops, focusing on program goals, procedures, techniques, current topics of interest (ex: insect status), etc, and
- b. Maintains and provides a "Vendor List" to interested property owners: additional vendors may be found in the phone book, newspaper, etc. Actual use of, or selection of, vendor(s) is the responsibility of the property owner.

Standards and objectives, including the DFC, for any site is guided by the City's FSP and the CWPP. In general, thinning operations are characterized by the following:

1. There is no single-focus on tree diameter. While we know from experience that the majority (85+%) of the trees needing to be removed are under 9-inches in diameter, cutting of larger diameter trees may occur as conditions warrant.
2. On average, approximately 65+% of any existing stand is removed during thinning operations. The majority of these trees are 6-inch diameter or less, thereby reducing "ladder" fuels and taking initial steps to reduce overcrowding within the stand.
3. The target tree-density for any-given site following thinning is 60-90 Basal Area. It will most-likely, however, be somewhat higher (100-120 BA) on sites that will undergo development in the near future, thus allowing for anticipated additional tree loss during construction activities. Where possible, trees will not be evenly spaced, but retained in a clumpy-pattern, thereby mimicking the historical pattern of interspersed meadows and tree clusters.
4. Other tree species (aspen, pinon, juniper, oak), where encountered, will be retained.
5. Thinning and debris-piling operational standards are found in Appendix 4.

**PRESCRIBED FIRE:** There is a clear need (from both a *protection* and *ecosystem health* standpoint) to conduct prescribed burn operations within-and-adjacent to the City. The challenge is to conduct these operations in such a manner so as to balance community acceptance with resource need: Smoke management is a key, and probably the most-critical, aspect in this regard.

Only FFD will conduct Rx Fire – broadcast and pile – operations within the city. *NOTE- as indicated earlier, the lone exception to this exclusion is the use of a permitted Air Curtain Destructor type unit to burn vegetation on site.* Outside the City, but within contract areas, vendors and/or the property owner may conduct these type burns, but are encouraged to obtain a free “Burn Certificate” from FFD prior to ignition.

Standard FFD smoke management practices are found in Appendix 5.

The process to plan, implement, and document Rx Fire activities is as follows:

- 1) If necessary:
  - Complete a written burn plan for the site.
  - Submit ADEQ required paperwork.
  - Determine most likely and desired smoke dispersal pattern, as well as neighborshed area.
- 2) Prepare burn site: This may involve:
  - Thinning of trees.
  - Construction of perimeter control lines.
  - Construction of interior check lines.
  - Isolation of snags, stumps, large downed logs, fence posts, power poles, specimen trees, or other items.
  - Raking deep duff away from base of large living pines.
- 3) Within 24 hours of planned ignition, complete the following:
  - Notification of known smoke sensitive individuals/locations of anticipated smoke-plume area.
  - Post signs on-site/in-area.
  - Coordinate burning with adjacent Fire agencies.
  - Submit proper ADEQ Burn Request form (if applicable).
  - Check NWS fire-weather forecast: visit <http://www.wrh.noaa.gov/fgz/fwz/gfwxz.php?sid=fgz&zone=AZZ115>
  - Confirm schedule and resource availability.
  - Notify media.
- 4) On ignition day:
  - Reconfirm NWS fire weather forecast – obtain Spot Wx Forecast as needed.
  - Notify EVERYONE via City email.
  - Confirm notification of known smoke sensitive individuals/locations within anticipated smoke-plume area.
  - Notify ALARM, USFS Dispatch, and FFD stations.
  - Conduct briefing for all assigned resources
  - Conduct test burn: monitor fire behavior, fire effects, and smoke dispersal.



- If conditions acceptable, conduct burn operation.
  - Take on-site weather observations as needed; visually monitor smoke impacts (see Table 1 below).
- 5) Following burn:
- Remove any signs.
  - Submit ADEQ Burn Accomplishment form by 2:00 pm the following day (if applicable).
  - Check ADEQ's Flagstaff Air Monitor  
[http://www.phoenixvis.net/PPMdata.aspx?sitename=Flagstaff&sitecode=451&sitetype=PM10&sitelat=35%20deg%2012%20min%2022%20sec&sitelong=111%20deg%2039%20min%2010%20sec&siteadd=755%20N.%20Bonito%20St.%20Flagstaff&siteinfo=\\*\\*\\*%20Roof%20maintenance%20activity%20near%20the%20particle%20monitor%20may%20affect%20the%20measured%20particle%20concentration.%20Use%20the%20data%20with%20caution.%20\\*\\*\\*](http://www.phoenixvis.net/PPMdata.aspx?sitename=Flagstaff&sitecode=451&sitetype=PM10&sitelat=35%20deg%2012%20min%2022%20sec&sitelong=111%20deg%2039%20min%2010%20sec&siteadd=755%20N.%20Bonito%20St.%20Flagstaff&siteinfo=***%20Roof%20maintenance%20activity%20near%20the%20particle%20monitor%20may%20affect%20the%20measured%20particle%20concentration.%20Use%20the%20data%20with%20caution.%20***)
  - Monitor until declared "out".

**TABLE 1**  
 Approved by ADEQ for determining smoke impacts

| <b><u>CATEGORIES</u></b>       | <b><u>AIR QUALITY INDEX</u></b> | <b><u>VISIBILITY</u></b> |
|--------------------------------|---------------------------------|--------------------------|
| Good                           | 0 – 50                          | 10+ miles                |
| Moderate                       | 51 – 100                        | 5 - 10 miles             |
| Unhealthy for Sensitive Groups | 101 – 150                       | 3 - 5 miles              |
| Unhealthy                      | 151-200                         | 1½ - 3 miles             |
| Very Unhealthy                 | 201 - 300                       | 1 - 1½ miles             |
| Hazardous                      | > 301                           | < 1 mile                 |

- Face away from the sun
- Determine the limit of your visible range by looking for targets at known distance (miles). Visible range is that point at which even high contrast objects totally disappear.
- Use the values above to determine the local forest fire smoke category.
- Adjust ignition and/or mop-up requirements should values exceed, and/or are projected to remain in an unacceptable category for an extended length-of-time.

**EXEMPTIONS:** Two broad exemptions exist. They are:

- 1) Utility companies, such as Arizona Public Service (APS), private arborists, and groups such as the Flagstaff Tree Board and City Clean & Green are not required to follow the requirements of this document when selecting, planting, and maintaining individual trees.

- 2) Hazard Mitigation - State and Federal agencies are not required to follow the requirements of this document for activities on their respective lands, but are encouraged to coordinate these activities with the FM Staff.

**SUMMARY:** These Guidelines are designed to permit FFD to respond in a professional, efficient, and sensitive manner to both need and opportunity and to communicate our overall intent and operational process to other interested parties.

Revision may occur at any time due to changes in technology, knowledge-base, or practices proven to enhance our ability to conduct the necessary Hazard Mitigation activities.

# APPENDIX 1

## *Restoration-Based Hazard Mitigation Position Statement*

*Abstract: Treatments designed to reduce the risk of catastrophic wildfire are compatible with, and in fact complement, the principles of forest restoration. To achieve the later, one must implement the former.*

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*Wildfire is a natural event within the southwestern ponderosa pine forest. Its very occurrence is a necessary ingredient to a healthy ecosystem. However, due to past management practices, natural fuel accumulations have been increasing for decades, resulting in an escalating trend in dangerous and destructive wildfires.*

*Unlike other forest issues, catastrophic fire captures the public's attention: it is dramatic, scary, threatening, and awesome, all at the same time. A green tree, even though stressed by overcrowding or infected with dwarf-mistletoe, appears "healthy" to the average citizen: a tree on fire is an all-together different story.*

*The 1996 fire season in our area clearly demonstrated this trend and directed the attention of the public to the plight of our forests and the risk posed by catastrophic wildfire. The result was an energized community, committed to action, who understood that if reduction of the fire threat was not addressed, we could very well find ourselves without anything to restore.*

*Restoration should be viewed as a journey rather than a destination. One is a goal, the other a treatment designed to move us in that direction. Fuel Management is not subordinate to Restoration: it is part of the restoration process.*

*Restoration-based fuel management treatments incorporate the principles of restoration ecology. Practices are designed to reduce excessive numbers of smaller trees, retain large trees, and accept natural fire (or apply prescribed fire to mimic the natural event). More than one treatment, along with other practices, over a period of time may be required to create the conditions necessary for an improvement in overall ecosystem health.*

*Implemented properly, Hazard Mitigation activities are a socially-accepted, and welcomed, practice. Should nothing be done, catastrophic fires will continue to reign unabated. Hazard Mitigation is clearly a step toward restoring healthy ecosystems and creating a sustainable forest and community.*

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# **APPENDIX 2**

## ***Fire Prevention Supplementary Regulations – Vegetation***

**FPR-007 – Hazardous Fuels – *Identification & Notification***

**FPR-WUI-001 –Service Provider Qualifications – *Vegetation Management***

**FPR-WUI-002 – Associated Fees – *Vegetation Management***

## FLAGSTAFF FIRE DEPARTMENT FIRE PREVENTION REGULATION

NUMBER: FPR-007  
DATE REVISED: December 2011  
RESCINDS: March 2008  
AUTHOR: Paul Summerfelt  
SUBJECT: **HAZARDOUS FUELS**

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**SCOPE:** To clarify how Appendix C-2 (Property Maintenance) of the 2006 Wildland Urban Interface Fire Code (WUI Code) will be delivered.

**IDENTIFICATION:** Hazardous Fuels are defined in the WUI Code-Chapter 2: *Definitions*. The Flagstaff Fire Department discovers hazardous fuels via a) Direct observation, b) Reporting from other agencies/personnel, c) Public complaints.

**RATING FORMAT:** Once discovered, an inspection utilizing Appendix C-2 (WUI Code) will occur.

**ACTIONS:**

*Public Property* – Fuel Crew removes trees (individuals or groups) not requiring specialty training, equipment: those which require specialty training are referred to Public Works or Parks and Recreation for removal by a vendor. Other vegetation or debris is referred to the proper City department for mitigation – usually by mowing or pick-up.

*Private Property* – Property owners are notified as follows:

1. Initial Notice – Notification (direct contact, phone, email, or mail) informing individual of issue and requesting removal/remediation of hazard by a set-date (usually 45-60 days from expected receipt: may be less depending on severity of threat). If hazard not addressed within specified time frame, or if situation/conditions require immediate action, then . . .
2. Formal Direction – Notification directing removal/remediation of hazard by a set-date (usually 30-45 days from expected receipt: may be less depending on severity of threat). If hazard not addressed within specified time frame, then . . .
3. Referral – Matter referred to the City's Legal Department for resolution.

*Easements & Right-of-Ways:*

1. Utility easements and Highway right-of-ways –
  - a) APS - letter sent to APS requiring removal (ie – enforcement),
  - b) ADOT – letter sent requesting (ie – cooperation) removal or mitigation.
2. City easements – responsibility of property owner.
3. City right-of-ways – responsibility of City.

**FLAGSTAFF FIRE DEPARTMENT  
FIRE PREVENTION REGULATION**

NUMBER: FPR-WUI-001  
DATE: May 5, 2009  
AUTHOR: Fire Management Officer Paul Summerfelt  
Assistant Fire Manager (*FireWise Services*) Mark Shiery  
SUBJECT: **SERVICE PROVIDER QUALIFICATIONS – Vegetation  
Management**

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**INTENT:** To identify minimum Knowledge-Skills-Abilities (KSA's) to ensure the Safety and Welfare of the public and Service Providers operating on properties within the City of Flagstaff.

**SCOPE:** Flagstaff Wildland Urban Interface Code (City Code 5-02-001-0001, Ordinance #2008-02): Sections 102.1 (*Powers and duties of the code official*), 102.2 (*Interpretations, rules, and regulations*), 202 (*Definitions*), and B101.2 (*Plan content*).

**DEFINITION:** Service Providers are defined as those who develop, provide, or implement Vegetation Management plans or activities as specified Section 202 (*Definitions – Vegetation Management*).

**APPLICATION:** Service Providers must satisfactorily demonstrate competency to the code official in the following areas before implementation of vegetation management activities:

| <b><u>AREA</u></b> | <b><u>EXAMPLES (not all inclusive)</u></b>   |
|--------------------|--|
| Knowledge          | Professional development course work or other training sessions associated with forest or tree care,<br>Professional certification or other qualifications,<br>Understanding of City of Flagstaff Wildland Urban Interface Code and/or Land Development Code, Flagstaff Fire Dept Wildland Fire FireWise Neighborhood program and/or field operations, or other professional practices |
| Skills             | Ability to prepare satisfactory Vegetation Management plan,<br>Previous satisfactory work in the Flagstaff area and/or ponderosa-pine vegetation type (within past two years),<br>Capacity to identify common tree and forest conditions and corrective actions  |
| Abilities          | Adequate work force,<br>Maintained and operational equipment,<br>Insurance   |

The code official may permit a Service Provider to undertake vegetation management activities on a trial-basis to establish competency, or otherwise implement activities if doing so best serves the public's interests, provided adequate safety measures and other mitigating factors are in-place - refer to *FFD Tree Removal Safety Tips*.

## **FFD Tree Removal Safety Tips**

Removal of trees is a high risk operation with potential impacts to operators and the public. Mitigating this risk through safe work practices will result in a positive and professional operation. The following is a list of items meeting industry standards:

### **Personal Protective Gear**

- ☐ Hardhat
- ☐ Long sleeve shirt and long pants
- ☐ Gloves
- ☐ Leather work boots
- ☐ Eye protection

### **Chainsaw Operations**

- ☐ Chainsaw chaps/pants of appropriate length to cover top of boots
- ☐ Hearing protection

### **Technical Tree Removal**

- ☐ Follow industry technical tree removal standards (climbing and/or aerial)  
Ex: International Society of Arboriculture Tree Climbing or Aerial Specialist
- ☐ Use extreme caution working around overhead lines – contact APS for a consultation on tree removal that may impact power-lines.

### **Public Safety**

- ☐ Appropriate signage to warn public
- ☐ Personnel to manage traffic flow if removal occurs along public travel routes
- ☐ High visibility traffic cones increasing visibility of mechanized equipment parked on public travel routes

**FLAGSTAFF FIRE DEPARTMENT  
FIRE PREVENTION REGULATION**

NUMBER: FPR-WUI-002  
DATE: October 2009  
AUTHOR: Wildland Fire Management Officer Paul Summerfelt  
SUBJECT: ***Vegetation Management Permits & Fees***

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**ADMINISTRATION**

- 1) **Plan** – The Community Wildfire Protection Plan, the General Forest Stewardship Plan, and the Hazard Fuels Mitigation Guidelines, combined, shall serve as *the Vegetation Management Plan* for most properties. In such cases, a *Site Operations Plan* (copy attached) will be required to be completed and approved prior to issuance of a Permit. Fire Dept staff will assist as needed, and may complete the *Site Operations Plan*.

However, based upon the complexity, size, or other issues associated with a site, a more complete *Vegetation Management Plan* (as determined by the Code Official) may be required. If so, it is to be completed by the owner/developer (or a consultant forester) and will need to be submitted/approved by the Fire Department prior to issuance of a *Permit*.

- 2) **Permits (general)** – A *Permit* will be required and issued to the owner/physical address of a property where vegetation work associated with mitigation of hazardous fuels (tree removal and/or debris disposal work such as individual hazard tree removal, selective thinning, and/or chipping, piling, or other elimination of dead-and-downed needles, brush, and woody material, etc) is to occur:
- a) Within the designated Wildland-Urban Interface (WUI) area (Chapter 3 – *Flagstaff WUI Code*); and
  - b) On those properties which are one (1.0) acre or larger in size.

EXCEPTIONS: A *Permit* is required on any sized property where any of the following conditions exist:

- (i) A “distinct danger” has been declared by the Flagstaff Fire Dept (Sections 101.2, 107.4.5, Chapter 6, and Appendix C - *Flagstaff WUI Code*);
- (ii) Development is planned and building permit(s) are being sought as evidenced by a request from the owner/developer to the City’s Community Development Dept - Development Review Board process;
- (iii) An Air-Curtain Destructor device, or similar unit, is to be utilized on-site to dispose of debris.

The *Permit* does not replace or otherwise invalidate any other required permits of the City.

3) **Permit Types & Associated Fees** –

**a) Plan Review:** Pertains to review and follow-on progress inspections of either a *Site Operations Plan* (most properties) or a complete *Vegetation Management Plan* (some properties). A Fee of **\$50** will be charged for each separate Plan, regardless of who completes the Plan. However, a comprehensive effort (ex: thinning with chipping) is considered as one Plan.

- (1) Payment of the fee can be made by the owner, developer, or Vendor.
- (2) Payment must be received prior to issuance of a *Permit*.
- (3) The goal will be to issue a *Permit* no later than two weeks following receipt of a completed Plan; in some cases, it may occur immediately.



**b) Work:** Pertains to any property where hazard fuel mitigation work (ex: thinning, burning, etc) is to be conducted by Fire Dept personnel. A Fee of **\$400** per property will be charged for each separate work activity. However, a comprehensive operation (ex: site preparation and broadcast burning) will be considered one single work effort.

# **APPENDIX 3**

*Vegetation Management Site Operations Plan Format*

*Hazard Tree Removal*

*Hazardous Fuels Mitigation*

# Flagstaff Fire Department

## Hazardous Tree Removal

### *Site Operations Plan*

This plan pertains to vegetation management work required to eliminate a public safety hazard. This format will be satisfactory for most work – however, based upon the extent of the problem or other issues associated with a site, a more complete plan with greater detail may be required.

### **GENERAL INFORMATION**

Property Owner: \_\_\_\_\_

Property ID # \_\_\_\_\_ FAC # \_\_\_\_\_

Property Address: \_\_\_\_\_

### **OPERATIONS:**

#### **Public Safety**

Fire Dept on-site presence required during removal: ☐ Yes ☐ No

☐ Notification of utility company (if power/phone/other utilities present)

☐ Notification of adjacent neighbors

☐ Placement of road cones or other signage

Where - \_\_\_\_\_

Other: \_\_\_\_\_

#### **Wood and Slash Disposal**

☐ Wood: \_\_\_\_ Left on-site \_\_\_\_ Chipped \_\_\_\_ Hauled away

☐ Slash: \_\_\_\_ Left on-site \_\_\_\_ Chipped \_\_\_\_ Hauled away

☐ Other: \_\_\_\_\_

#### **Other**

\_\_\_\_\_

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### **To be Completed by FFD**

#### **Action**

☐ Approved: Date: \_\_\_\_\_

☐ Other

\_\_\_\_\_  
Signature

Date: \_\_\_\_\_

# Flagstaff Fire Department

## Hazardous Fuel Mitigation

### *Site Operations Plan*

This plan pertains to vegetation management work required to reduce wildfire hazard, create a FireWise property and neighborhood, and promote forest health and sustainability. This format will be satisfactory for most work – however, based upon the complexity, size, or other issues associated with a site, a more complete plan with greater detail may be required.

### **GENERAL INFORMATION**

Property Owner: \_\_\_\_\_

Property ID # \_\_\_\_\_ FAC # \_\_\_\_\_

Property Address: \_\_\_\_\_

Acreage: \_\_\_\_\_

### **CONDITONS:**

#### **Pre-Treatment –**

Tree/Stand data: \_\_\_\_\_ Ave #/acre \_\_\_\_\_ Ave BA/acre \_\_\_\_\_ Ave diameter

Insect/Disease/Other: \_\_\_\_\_

#### **Post-Treatment (Desired) –**

Tree/Stand data: \_\_\_\_\_ Ave #/acre \_\_\_\_\_ Ave BA/acre \_\_\_\_\_ Ave diameter

Insect/Disease/Other: \_\_\_\_\_

### **OPERATIONS:**

#### **Cutting Actions Planned**

Type: ☐ Mechanical ☐ Hand

Each day, cut trees must be:

- 1) Pulled to landing,
- 2) Limbed, and
- 3) All Hang-Ups eliminated

Other actions: ☐ Pruning ☐ Other: \_\_\_\_\_

#### **Public Safety**

- ☐ Notification of utility company (if power/phone/other utilities present)
- ☐ Notification of adjacent neighbors
- ☐ Placement of road cones or other signage

Where - \_\_\_\_\_

☐ Fire suppression equipment on hand:

☐ Other: \_\_\_\_\_

### **Utilization**

☐ Large wood ( $\geq 3'$  in length and  $\geq 6''$  at the small end):

\_\_\_\_\_ Removed from site      \_\_\_\_\_ Piled and left on-site

\_\_\_\_\_ Chipped and left on-site      \_\_\_\_\_ Chipped and removed

☐ Stumps:

\_\_\_\_\_ Left in ground      \_\_\_\_\_ Pulled and removed      \_\_\_\_\_ Pulled and piled

\_\_\_\_\_ Chipped and left on-site      \_\_\_\_\_ Chipped and removed

☐ Other: \_\_\_\_\_

### **Slash Disposal**

☐ Hauled off-site

☐ Chipped: \_\_\_\_\_ Left on site (piles  $\leq 10'$  tall)      \_\_\_\_\_ Spread on-site

☐ Air-Curtain Destructor unit (or similar type technology)

☐ Piled on-site for later on-site burning by Fire Dept. If so, then all piles must be constructed so that:

- 1) All large diameter wood ( $\geq 6''$  at the small end) removed from pile,
- 2) All piles in open areas to reduce damage/mortality to residual trees,
- 3) All piles of adequate size and structure to facilitate quick combustion,
- 4) No piled material longer than  $8'$  in length, and
- 5) Every pile a minimum of five ft diameter by five ft tall in size

☐ Other: \_\_\_\_\_

### **Maintenance**

☐ Periodically by owner

☐ Other: \_\_\_\_\_

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## **To be Completed by FFD**

**Review:**      \_\_\_\_\_ Not required      \_\_\_\_\_ Completed – Date \_\_\_\_\_

Participants:      \_\_\_\_\_  
   \_\_\_\_\_

Comments: \_\_\_\_\_  
\_\_\_\_\_

**Action**

☐ Approved:

☐ Modification Required: \_\_\_\_\_

☐ Approved (following modification):

☐ Rejected: Why \_\_\_\_\_

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

# APPENDIX 4

## *Tree Thinning & Debris Piling Guidelines*

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The following guidelines are for contractors and property owners. Purpose is to standardize job performance, facilitate wood removal, allow for efficient slash disposal, ensure visual quality, and demonstrate quality operations.

THINNING:    *\*\*All trees to be limbed, bucked, and stacked at the end of work day \*\**

- Stumps shall be no higher than four (4) inches above ground level.
- All trees “hung-up” in another tree are to be pulled or cut immediately.
- Trees identified for cutting shall be cut unless doing so will endanger sawyer or damage property.
- All wood in excess of six (6) inches diameter (large end) shall be bucked into three (3) foot lengths and stacked – neatly and away from residual trees and slash piles. (EXCEPTION – longer lengths for poles or posts allowed if approved by property owner/City.)

PILING SLASH:    *\*\* All slash is to be piled at the end of work day \*\**

*Location:*

- Place in open areas, at least ten (10) feet from residual trees or other combustibles (includes old stumps, large logs, other piles, etc).
- Avoid placing under power-lines or overhanging tree branches.
- NOTE: Extra trees may need to be cut to accommodate pile location: approval required of property owner/FFD.

*Size:*

- Shape shall resemble a cone.
- Minimum size shall be five (5) feet high x five (5) feet diameter.
- Large open areas may allow for larger piles, but in no case shall handpile be in excess of eight (8) feet high x eight (8) feet wide.

*Construction:*

- Start by layering tops and small branches: this material is be no more than four (4) feet in length.
- Add larger branches, no more than five (5) feet in length: large end toward top of pile.
- Compact pile – by standing on or pushing down material – in order to compress material.
- Finally, wood less than six (6) inches diameter (large end) and shorter than three (3) feet in length may be added to outside and top of pile. This material should never form the bulk of the pile.

*Approval:*

- Completed piles must be approved by FFD prior to completion of project.

# APPENDIX 5

## *SMOKE MANAGEMENT PRACTICES*

There is a clear need to conduct prescribed burn operations within-and-adjacent to the City to both reduce risk of catastrophic wildfire promote and ensure ecosystem health. While FFD only produces an estimated 10% of all wildland-generated smoke in the greater Flagstaff area, nonetheless, the challenge is to conduct these operations in a professional manner, one that balances community acceptance and support with resource need.

Burns will be conducted so as to ensure operational control and continued public support, involving the aggressive, and routine, application of a variety of mitigation measures. These include:

**Notify.** Prior advertisement builds trust, and avoids unpleasant surprises. It allows us to identify neighborhood and individual concerns -- and plan our response -- before ignition.

- a) PERMIT: Obtain a permit from the AZ Dept of Environmental Quality prior to ignition (allows for assessment of potential cumulative effects and coordination among different agencies and organization)
- b) NEIGHBORHOOD NOTICE: Hand-delivered to homes and businesses adjacent to the burn unit, as well as those most directly impacted by any smoke.
- c) SIGNS: Street signs will be placed at access points into the burn unit, preferably placed the day prior to ignition.
- d) PERSONAL NOTIFICATION: A listing of those individuals who wish to be personally contacted when a burn is ignited in their neighborhood is maintained and constantly updated: Notification to occur before ignition.
- e) MEDIA NOTICE: Provided to local media 1-2 days prior to any planned ignition.
- f) ALARM NOTICE: Provided to Fire/Police ALARM Room and the US Forest Service Dispatch Center 1-2 hours before ignition.
- g) SOCIAL MEDIA NOTICE: Distributed via Twitter and Facebook 1-2 hrs before ignition.
- h) CITY-WIDE NOTICE: E-mailed notice to all city staff (EVERYONE) 1-2 hours before ignition.

**Avoid:**

- a) Select only appropriate sites to burn.
- b) In areas near schools, burn only when school is not in session or when favorable wind conditions occur so impacts are non-existent.
- c) Do not burn in immediate vicinity of Flagstaff Medical Center, nursing homes, or similar occupancies.
- d) Do not burn near parks on days when large events are planned.
- e) If possible, schedule burns during times when seasonal homeowners will be absent.



- f) The Fuel Management Officer (FMO) or his designee will decide the appropriate burn size for the day based primarily upon smoke dispersion and neighborhood sensitivity. While no formal maximum #'s are set, they will generally be as follows:

Piles – 150 piles or less per day no more than once every five days in a single neighborshed unless favorable wind conditions are present

Broadcast – 50 acres or less once every week in a single neighborshed.

*NOTE: Neighborshed = the area within a neighborhood or geographic area within the city (and surrounding county land) where smoke will accumulate and remain visible for four hours or more following the burn. Particular attention must be paid to anticipated nighttime smoke pooling.*

- g) If burning adjacent to an occupied business, high density dwelling, etc, notify manager so they may shut down Heat-Ventilation-Air Conditioning (HVAC) system(s).
- h) For those with legitimate smoke-related health problems who will be seriously impacted by smoke, FFD will reimburse them for motel and restaurant expenses, not to exceed one night. This must be coordinated and approved by the FMO or his designee before expenses are incurred.

#### **Dilute:**

- a) In general, burn when ventilation is Good or Excellent as forecast by the NWS, Flagstaff office. *(Exceptions based upon limited # piles/acreage/composition may occur).*
- b) During burn operation, monitor smoke column and path: adjust ignition speed and duration if necessary.
- c) Where conditions permit, conduct burns during summer months. Longer daylight hours and warmer evening temperatures will allow for better overall ventilation.

#### **Reduce:**

- a) Prior to ignition, if possible, remove wood (ex: firewood), and/or chip-and-remove some material.
- b) In general, ignite no earlier than 09:00 am and no later than 2:00 pm.
- c) Isolate and avoid ignition of large dead and downed material.
- d) Target only those fuels – 1 hr and 10 hr fuels generally – that are most likely to contribute to the spread of a wildfire.
- e) Burn when target fuels are dry. Recognize that, as a rule-of-thumb, for every 1% increase in 1000 hr fuel moisture, approximately 3% less smoke will be emitted from the burn site. (NOTE: on occasion, on selected sites, night-time ignition will occur, provided rain-snow is occurring and will continue for the remainder of the night.)
- f) Burn only vegetation: avoid other material found on-site.
- g) Prior to general ignition, pile woody material: this encourages efficient burning, and produces less smoke than smoldering material.
- i) Utilize a backing fire when practical. Recognize that, as a rule-of-thumb, a backing fire, while slower, will consume more fuel in the flaming stage and reduce emissions on a burn unit by an estimated 50%.
- j) Where necessary, mop-up and extinguish burning stumps and other large material.

- k) If unacceptable or unforeseen smoke issues develop, curtail burning until conditions improve.
- l) Recognize the first burn on any particular site will produce the most smoke, due to the consumption of 50-100 years of accumulated fuels. Follow-up burns will produce significantly less smoke.
- l) Practice alternate methods of disposal where appropriate (chipping, air curtain destructor unit, etc).